



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/656,777	09/07/2000	Junji Kuyama	09793822-0409	1570

26263 7590 10/05/2004

SONNENSCHN NATH & ROSENTHAL LLP  
P.O. BOX 061080  
WACKER DRIVE STATION, SEARS TOWER  
CHICAGO, IL 60606-1080

EXAMINER

WILLS, MONIQUE M

ART UNIT	PAPER NUMBER
----------	--------------

1746

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



## Office Action Summary

Application No.

09/656,777

Applicant(s)

KUYAMA ET AL.

Examiner

Monique M Wills

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 23-34 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.



**DETAILED ACTION**

***Request for Continued Examination***

A Request for Continued Examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 30, 2004 has been entered.

The following actions are overcome:

- The objection of claim 27, because of the misspelling of polyvinylidene fluoride
- The rejection of claims 23 & 24, under 35 U.S.C. § 112, second paragraph as being indefinite.

The following rejections are maintained:

- Claims 23-25, 29-31 & 33-34 under 35 U.S.C. § 102(e) as being anticipated by Isoyama et al., U.S. Patent 6,093,503.
- Claims 26- 28 & 32 under 35 U.S.C. § 103(a) as being unpatentable over Isoyama et al., U.S. Patent 6,093,503 in view of Miyasaka U.S. Patent 5,869,208.



*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 23-25, 29-31 & 33-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Isoyama et al., U.S. Patent 6,093,503.

With respect to claims 23 & 29, Isoyama teaches a method of making a positive electrode active material comprising: mixing a first ingredient of Ketjen Black and 90% by weight of lithium manganese oxide (Example 22); press molding the mixture (col. 12, lines 5-10); sintering the mixture in a temperature range from 300 to 1200°C embracing Applicant's range not lower than 600°C and not higher than 850°C (col. 7, lines 57-68); wherein the positive electrode is a lithium composite manganese oxide comprising an aggregate (col.2, lines 12-20) of primary particles having a grain diameter of 1 to 20 microns and the negative electrode is a metallic lithium (col. 2, lines 12-20). Further concerning claim 23, the lithium composite oxide is  $\text{LiMn}_2\text{O}_4$  meeting the general formula  $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_4$  where  $x=1$  and  $y=0$ . Further concerning claim 29, the negative electrode includes coke and an organic polymer compound sintered body (col. 23, lines 8-20). The limitation in claims 23 & 29, with respect to the specific surface area measured by BET between  $0.2\text{m}^2/\text{g}$  and  $2\text{m}^2/\text{g}$ , is considered to be an inherent property of the cathode material as set forth in the prior art, because Isoyama employs the same lithium manganese oxide material with the same primary particle size as set forth by Applicant. The limitation in claims 23, 29 & 30, with respect to the negative



Art Unit: 1746

electrode material reversibly doping and dedoping lithium is considered to be an inherent property of the negative electrode as set forth in the prior art, because Isoyama employs the same lithium anodic material set forth by Applicant. Additionally, "products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ 2d 1655, 1658.

With respect to claims 24 & 25, the spinel  $\text{LiMn}_2\text{O}_4$  (col. 6, lines 25-30) has a primary particle size of 1 to 20 microns, embracing a primary particle diameter of 0.5 to 3 microns. Specific particle sizes of about 1 to 3 microns are exemplified in column 29, lines 24-50. With respect to claim 31, the negative electrode is metallic lithium (col. 2, lines 30-40). With respect to claim 33, the electrolyte salts include  $\text{LiClO}_4$ ,  $\text{LiBF}_6$ ,  $\text{LiPF}_6$ ,  $\text{LiCF}_3\text{SO}_3$  and  $\text{LiAsF}_6$  (col. 5, lines 40-45). Regarding claim 34, the electrolyte is dissolved in an organic solvent selected from propylene carbonate, diethyl carbonate and gamma-butyrolactone (col. 5, lines 41-46).

Therefore, the limitations are anticipated by the prior art set forth.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



Claims 26-28 & 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isoyama et al., U.S. Patent 6,093,503 in view of Miyasaka U.S. Patent 5,869,208.

Isoyama teaches a method of making a positive active material as described in the 35 U.S.C. § 102(e) rejection hereinabove. The method includes creating a slurry by kneading an admixture of graphite and polyvinylidene fluoride (col. 5, lines 35 & col. 39, lines 10-20) with  $\text{LiMnO}_2$  dissolved in a liquid phase (col. 39, lines 5-20). The lithium oxide, conductive agent and binder are mixed in a weight ratio of 9: 0.6 to 0.4 (col. 39, lines 10-20). With respect to claim 28, cathode material is applied to an aluminum foil current collector (col. 39, lines 10-15) with a thickness of 0.02 to 200 microns.

Isoyama is silent to created a slurry of active material, binder and conductive again (claims 27 & 32), employing 86% lithium composite manganese oxide (claim 27) and 10% graphite (claims 27 & 32). The reference is also silent to pulverizing the sintered mixture (claim 26).

Miyasaka teaches that it is conventional to create a slurry of electrode material prior to coating on a current collector (col. 123, lines 5-15). The electrode material includes lithium manganese oxide, a binder and conductive agent (col. 12, lines 5-15). The reference also teaches pulverizing to increase the specific surface area of the active material (col. 11, lines 20-30).

It would have been obvious to one having ordinary skill in the art at the time the instant invention was made to employ the slurry preparation of Miyasaka in the method of Isoyama, in order to facilitate coating electrode material on the current collector. The skilled artisan recognizes that a slurry would increase malleability of the active material thereby improving coating ability of said material on the current collector (claims 27 & 32).



With respect to pulverizing the sintered electrode material (claim 26), the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made, because even though Isoyama is silent to pulverizing the active material, Miyasaka teaches that pulverization increases the specific surface area of the active material (col. 11, lines 20-30).

With respect to the amount of lithium manganese oxide, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ 86% by weight lithium manganese oxide since it has been held that discovering optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 2727, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes that the amount of active material directly effects the amount of voltage and current produced by the cell.

With respect to the amount of graphite, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ 10% by weight of graphite since it has been held that discovering optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes that the amount of conductive agent directly effects conductivity of the electrode.



*Response to Arguments*

Applicant asserts that Isoyama is not anticipatory because the reference does not teach a lithium composite manganese oxide with a particle diameter of *not less than 0.05  $\mu\text{m}$  and not greater than 10  $\mu\text{m}$* , since Isoyama's range of 1 to 20  $\mu\text{m}$  clearly suggests a primary particle diameter greater than 10  $\mu\text{m}$ . Additionally, Isoyama teaches centering the mixture at a temperature in the range of 300 to 1200°C. However, such a range does not teach or suggest centering a mixture at a temperature *not lower than 600°C and not higher than 850°C*, since the range of 300°C to 1200°C clearly suggest a centering temperature that is lower than 600°C and higher than 850°C. This argument is not persuasive. According to M.P.E.P. § 2131.03, a specific example in the prior art within a claimed range, anticipates the range. Therefore, Isoyama anticipates the instant ranges, because the reference exemplifies a  $\text{LiMn}_2\text{O}_4$  cathode material having a particle size of 1  $\mu\text{m}$  being centered in air at 600°C for 24 hrs. See Example 4. Accordingly, the claimed in invention is properly anticipated by Isoyama with respect to claims 23-25, 29-31 & 33-34 and Isoyama in view of Miyasaka are obvious over claims 27, 28 & 32.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.



If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Michael Barr, may be reached at 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MW

09/30/04

**MICHAEL BARR**  
**SUPERVISORY PATENT EXAMINER**

A handwritten signature in black ink, appearing to read 'Michael Barr', with a long horizontal flourish extending to the right.